

## **Abstract**

Integrated modeling and symbolic manipulation is leveraged for the derivation, construction, maintenance, and reuse of application-independent models. Related models created for different applications share a common ancestry and maintain model consistency while enabling the models to share information about the process.

Environment independent proper ancestor models (PAMs) are created for generic components of a process, such as a distillation or flash column. Models underlying an application may be comprised of various representations of multiple such processes corresponding to many different physical components. PAMs contain symbolic representations of different sub processes that occur within a process or component. A user makes assumptions about the component, by indicating how sub processes are to be considered or not considered. PAMs are then modified in accordance with the assumptions to derive a specific environment model (SEM).